

REMARKS

Reconsideration of the above-referenced application in view of the following remarks is respectfully requested.

Claims 1-12 and 19 were pending in this application. Applicant hereby confirms the election of Claims 1-12 and acknowledges that Claim 19 has been withdrawn from further consideration. Applicant also acknowledges that Claims 13-18 have been withdrawn from consideration following an earlier election. Non-elected Claims 13-19 have been cancelled without prejudice.

Claims 1 and 5-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Neuhaus, et al. (U.S. Patent Publication 2002/0027294). Claim 1, as amended, includes the features of "a chip having an array of flip chip contact terminals on the first surface thermo-compression bonded directly to mirroring contact pads on the first major surface of a substrate" and "a thermosetting adhesive polymerized by energy from infrared radiation of the second surface of said chip mechanically connecting and filling the space between the chip and substrate." Neuhaus does not show or suggest these features. For example, rather than chip contact terminals thermo-compression bonded directly to substrate contact pads, Neuhaus relies on hard particles 118 to establish contact between metallized bonding pads 120 and contact lands 114 (see paragraph [0054]) and thus teaches away from the claimed invention. Claims 5-11 depend from Claim 1 and are therefore patentable over Neuhaus for at least the reasons presented above.

Claims 2-4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Neuhaus as applied to claim 1 above, and further in view of Sakurai (U.S. Patent Publication 2002/0079594). As argued above, Neuhaus does not teach or suggest all of the features of Claim 1, but in fact teaches away from the

claimed invention. Sakurai does not cure the deficiencies of Claim 1. For example, Sakurai relies on conductive particles 52 to establish contact between bumps 44 and interconnecting lines 24 (see paragraph [0094]). See also paragraph [0073] in which Sakurai states that bumps 14 are electrically connected to connecting portions 26 with conducting particles interposed. Thus, Sakurai also teaches away from the claimed invention. Therefore, Applicant respectfully submits that Claim 1 is patentable over Neuhaus in view of Sakurai. Claims 2-4 depend from Claim 1 and are therefore patentable over the proposed combination of references for at least the reasons presented above.

New Claim 20 includes the feature of "a substrate including an array of contact pads, wherein said contact terminals are in direct contact with said contact pads." Neither Neuhaus nor Sakurai teach or suggest such a feature. Therefore, Applicant respectfully submits that Claim 20 and Claims 21-22 which depend therefrom are patentable over the cited references. See the first paragraph on page 11 of the instant specification for support for the amendments to Claim 1 as well as for new Claim 20.

Applicant respectfully requests reconsideration and withdrawal of the rejections and allowance of Claims 1-12 and 20-22. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

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Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

1. (amended) A semiconductor device, including:[:]
 a [A] chip having an array of flip chip contact terminals on the first surface
 thermo-compression bonded directly to mirroring contact pads on the first major
 surface of a substrate; and[,]
 a thermosetting [an] adhesive polymerized by energy from infrared
 radiation of the second surface of said chip mechanically connecting and filling
 the space between the chip and substrate.

Please add the following new claims:

20. A semiconductor device, comprising:
 a chip including an array of contact terminals;
 a substrate including an array of contact pads, wherein said contact
 terminals are in direct contact with said contact pads; and
 a thermosetting adhesive between said chip and said substrate and in
 contact with said contact terminals and said contact pads.
21. The semiconductor device of Claim 20, wherein said contact terminals and
said contacts pads have a surface of gold.
22. The semiconductor device of Claim 20, wherein said thermosetting adhesive
has a gel time in the range of 1 to 5 seconds.